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CLAIMS

1. A stable calcium phosphate complex including phosphopeptide stabilized amorphous calcium fluoride phosphate or a derivative thereof wherein said phosphopeptide includes the amino acid sequence Ser(P)-Ser(P)-Ser(P)-Glu-Glu.

5 2. A complex according to claim 1 wherein the calcium fluoride phosphate has the approximate formula $[Ca_8(PO_4)_5 \cdot x H_2O]$ wherein $x \geq 1$.

3. A complex according to claim 2 further including HPO_4 .

10 4. A complex according to ~~any one of claims 1 to 3~~ wherein said phosphopeptide includes an amino acid sequence selected from any one of:

[1] $Gln^{59}\text{-Met-Glu-Ala-Glu-Ser(P)-Ile-Ser(P)-Ser(P)-Ser(P)-Glu-Glu-Ile-Val-Pro-Asn-Ser(P)-Val-Glu-Gln-Lys}^{79}$. $\alpha_{s1}(59-79)$

[2] $Arg^1\text{-Glu-Leu-Glu-Glu-Leu-Asn-Val-Pro-Gly-Glu-Ile-Val-Glu-Ser(P)-Leu-Ser(P)-Ser(P)-Ser(P)-Glu-Glu-Ser-Ile-Thr-Arg}^{25}$. $\beta(1-25)$

[3] $Asn^{46}\text{-Ala-Asn-Glu-Glu-Glu-Tyr-Ser-Ile-Gly-Ser(P)-Ser(P)-Ser(P)-Glu-Glu-Ser(P)-Ala-Glu-Val-Ala-Thr-Glu-Glu-Val-Lys}^{70}$. $\alpha_{s2}(46-70)$

[4] $Lys^1\text{-Asn-Thr-Met-Glu-His-Val-Ser(P)-Ser(P)-Ser(P)-Glu-Glu-Ser-Ile-Ile-Ser(P)-Gln-Glu-Thr-Tyr-Lys}^{21}$. $\alpha_{s2}(1-21)$.

15 5. A complex according to ~~any one of claims 1 to 3~~ wherein said phosphopeptide includes the amino acid sequence:

20 $Gln^{59}\text{-Met-Glu-Ala-Glu-Ser(P)-Ile-Ser(P)-Ser(P)-Ser(P)-Glu-Glu-Ile-Val-Pro-Asn-Ser(P)-Val-Glu-Gln-Lys}^{79}$. $\alpha_{s1}(59-79)$.

25 6. A complex according to ~~any one of claims 1 to 5~~ having a pH of about 7.0 to 9.0.

7. A stable soluble alkaline calcium phosphate complex including phosphopeptide stabilized amorphous calcium phosphate or a derivative thereof wherein said phosphopeptide includes the amino acid sequence Ser(P)-Ser(P)-Ser(P)-Glu-Glu.

30 8. A complex according to ~~claim 7~~ wherein said amorphous calcium phosphate is of the approximate formula $[Ca_3(PO_4)_2 \cdot x H_2O]$ wherein $x \geq 1$.

9. A complex according to claim 8 further including HPO_4 .
10. A complex according to ~~any one of claims 7 to 9~~ wherein said phosphopeptide includes an amino acid sequence selected from any one of:
- [1] Gln⁵⁹-Met-Glu-Ala-Glu-Ser(P)-Ile-Ser(P)-Ser(P)-Glu-Glu-Ile-Val-Pro-Asn-Ser(P)-Val-Glu-Gln-Lys⁷⁹. $\alpha_{s1}(59-79)$
- [2] Arg¹-Glu-Leu-Glu-Glu-Leu-Asn-Val-Pro-Gly-Glu-Ile-Val-Glu-Ser(P)-Leu-Ser(P)-Ser(P)-Glu-Glu-Ser-Ile-Thr-Arg²⁵. $\beta(1-25)$
- [3] Asn⁴⁶-Ala-Asn-Glu-Glu-Glu-Tyr-Ser-Ile-Gly-Ser(P)-Ser(P)-Ser(P)-Glu-Glu-Ser(P)-Ala-Glu-Val-Ala-Thr-Glu-Glu-Val-Lys⁷⁰. $\alpha_{s2}(46-70)$
- [4] Lys¹-Asn-Thr-Met-Glu-His-Val-Ser(P)-Ser(P)-Ser(P)-Glu-Glu-Ser-Ile-Ile-Ser(P)-Gln-Glu-Thr-Tyr-Lys⁶¹. $\alpha_{s2}(1-21)$.
11. A complex according to ~~any one of claims 7 to 9~~ wherein said phosphopeptide includes the amino acid sequence:
- Gln⁵⁹-Met-Glu-Ala-Glu-Ser(P)-Ile-Ser(P)-Ser(P)-Glu-Glu-Ile-Val-Pro-Asn-Ser(P)-Val-Glu-Gln-Lys⁷⁹. $\alpha_{s1}(59-79)$.
12. A complex according to ~~any one of claims 7 to 11~~ having the formula $[(\text{PP})(\text{CP})_8]_n$, where n is equal to or greater than 1.
13. A complex according to ~~any one of claims 7 to 12~~ having the formula $[(\text{PP})(\text{CP})_8]_6$.
14. A complex according to ~~any one of claims 7 to 10~~ having a pH of about 9.0.
15. A method of producing a stable alkaline calcium phosphate complex according to ~~any one of claims 1 to 14~~ including the steps of:
- (i) obtaining a solution of phosphopeptide having a pH of about 9.0;
- (ii) admixing (i) with solutions comprising calcium, and inorganic phosphate and optionally fluoride at a pH of about 9.0;
- (iii) filtering the mixture resulting from step (ii), and
- (iv) drying to obtain the said complex.
16. A complex according to ~~any one of claims 1 to 14~~ produced in accordance with the method of claim 15.

17. A delivery vehicle adapted to co-localise ions including calcium, fluoride and phosphate ions at a target site, said delivery vehicle including as an active ingredient, the complex of ~~any one of claims 1 to 14 or 16.~~

18. A delivery vehicle of claim 17 being ~~any one of toothpaste, toothpowder, liquid dentifrice, mouthwash, troches, chewing gum, dental paste, gingival massage cream, gargle tablets, dairy products and other foodstuffs.~~

19. A pharmaceutical composition including a complex according to ~~any one of claims 1 to 14 or 16~~ in combination with a pharmaceutical carrier.

20. An anticariogenic composition including the composition of claim 19 or the delivery vehicle according to claim 17 or 18 adapted for anticariogenic use.

21. A therapeutic composition including the composition of claim 19 adapted for therapeutic use.

22. A dietary supplement including a complex according to ~~any one of claims 1 to 14 or 16.~~

23. A dietary supplement according to claim 22 wherein said complex comprises 0.1 to 100% w/w of said supplement.

24. A dietary supplement according to claim 22 wherein said complex comprises 2% w/w of said supplement.

25. A method of treating or preventing dental caries or tooth decay including the step of administering a complex according to ~~any one of claims 1 to 14 or 16~~ to the teeth or gums of a subject in need of such treatment.

26. A method according to claim 25 including the topical administration of said complex.

27. A method of treating one or more conditions related to calcium loss from the body including bones, calcium deficiency, calcium malabsorption or the like including the administration of a complex according to ~~any one of claims 1 to 14 or 16~~ to a subject in need of such treatment.

28. The method of claim 27 wherein said condition includes osteoporosis and osteomalacia.

29. A complex according to any one of claims 1 to 14 or 16 as hereinbefore described.
30. A delivery vehicle according to claim 17 or 18 as hereinbefore described.
- 5 31. A pharmaceutical composition according to claim 19 as hereinbefore described.
32. An anticariogenic composition according to claim 20 as hereinbefore described.
33. A therapeutic composition according to claim 21 as hereinbefore described.
- 10 34. A dietary supplement according to any one of claims 22 to 24 as hereinbefore described.
35. A method of treatment according to any one of claims 25 to 28 substantially as hereinbefore described.
- 15 36. A method according to claim 8 substantially as hereinbefore described.

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